

IN THE CLAIMS:

1. (Currently Amended). A cross-incompatible maize plant that exhibits a Teosinte Crossing Barrier (TCB) trait, wherein said cross-incompatible plant comprises a ~~Teb~~ gene cluster that encodes for the TCB trait and further wherein said plant is derived from a maize plant designated W22-TCB, seeds of which have been deposited as ATCC No. PTA-1601.
2. (Currently Amended). The cross-incompatible plant of claim 1 wherein said plant fails to set seed when pollinated by plants lacking the ~~Teb~~ gene cluster but sets seed when pollinated by plants carrying the ~~Teb~~ gene cluster.
3. (Original). The cross-incompatible plant of claims 1 or 2 wherein said plant maintains functional pollen and sets seed when pollinated by itself or causes other maize plants to set seed when pollinated by said plant.
4. (Original). The cross-incompatible maize plant of claim 1 wherein said maize plant is an inbred plant.
5. (Original). The cross-incompatible maize plant of claim 1 wherein said maize plant is a hybrid plant.
- 6-8. (Canceled in Response to a Restriction Requirement).
9. (Currently Amended). A cross-incompatible maize plant that exhibits a Teosinte Crossing Barrier (TCB) trait, wherein said cross-incompatible plant comprises in its genome a ~~Teb~~ gene cluster, wherein the ~~Teb~~ gene cluster is located on the short arm of chromosome 4 between map units 40 and 85.
10. (Original). The cross-incompatible maize plant of claim 9 further

comprising a *Tcb* locus within its genome.

11. (Original). The cross-incompatible maize plant of claim 10 wherein said *Tcb* locus is located on the short arm of chromosome 4 about 6 map units distal to the *sugary1* gene and about 40 map units from the *Ga1* gene.

12. (Previously Presented). The cross-incompatible maize plant of claim 11 wherein said *Tcb* locus comprises at least one gene which encodes for a silk effect function in said plant.

13. (Previously Presented). The cross-incompatible maize plant of claim 11 wherein said *Tcb* locus comprises at least one gene which encodes for a pollen effect function in said plant.

14. (Previously Presented). The cross incompatible maize plant of claims 11, 12 or 13 further comprising at least one modifier gene within its genome.

15. (Currently Amended). A cross-incompatible maize plant comprising a ~~*Tcb*~~ gene cluster within its genome that encode a TCB trait and which (1) fails to set seed when pollinated by plants lacking the ~~*Tcb*~~ gene cluster but sets seed when pollinated by plants carrying the ~~*Tcb*~~ gene cluster; and (2) maintains functional pollen and sets seed when pollinated by itself or causes other maize plants to set seed when pollinated by said plant.

16. (Original). The cross-incompatible maize plant of claim 15 wherein said maize plant is an inbred plant.

17. (Original). The cross-incompatible maize plant of claim 15 wherein said maize plant is a hybrid plant.

18-20. (Canceled in Response to a Restriction Requirement).

21. (Previously Presented). The cross-incompatible maize plant of claim 15 wherein said gene cluster is located on the short arm of chromosome 4 between map units 40-85.

22. (Original). The cross-incompatible maize plant of claim 21 further comprising a *Tcb* locus within its genome.

23. (Original). The cross-incompatible maize plant of claim 22 wherein said *Tcb* locus is located on the short arm of chromosome 4 about 6 map units distal to the *sugary1* gene and about 40 map units from the *Ga1* gene.

24. (Original). The cross-incompatible maize plant of claim 22 wherein said *Tcb* locus comprises at least one gene which encodes for a silk effect function in said plant.

25. (Previously Presented). The cross-incompatible maize plant of claim 22 wherein said *Tcb* locus comprises at least one gene which encodes for a pollen effect function in said plant.

26. (Original). The cross-incompatible maize plant of claims 21, 22, 24 or 25 further comprising at least one modifier gene within its genome.

27. (Currently Amended). A cross-incompatible maize plant comprising a ~~*Tcb*~~ gene cluster within its genome wherein said ~~*Tcb*~~ gene cluster encodes a TCB trait and said gene cluster is derived from a maize plant designated W22-TCB, seed of which has been deposited as ATCC No. PTA-1601.

28. (Previously Presented). The cross-incompatible maize plant of

claim 27 wherein said gene cluster is located on the short arm of chromosome 4 between map units 40-85.

29. (Original). The cross-incompatible maize plant of claim 28 further comprising a *Tcb* locus within its genome.

30. (Original). The cross-incompatible maize plant of claim 29 wherein said *Tcb* locus is located on the short arm of chromosome 4 about 6 map units distal to the *sugary1* gene and about 40 map units from the *Ga1* gene.

31. (Original). The cross-incompatible maize plant of claim 29 wherein said *Tcb* locus comprises at least one gene which encodes for a silk effect function in said plant.

32. (Previously Presented). The cross-incompatible maize plant of claim 29 wherein said *Tcb* locus comprises at least one gene which encodes for a pollen effect function in said plant.

33. (Original). The cross-incompatible maize plant of claims 28, 29, 31 or 32 further comprising at least one modifier gene within its genome.

34. (Original). The cross-incompatible maize plant of claim 27 wherein said maize plant is an inbred plant.

35. (Original). The cross-incompatible maize plant of claim 27 wherein said maize plant is a hybrid plant.

36-38. (Canceled in Response to a Restriction Requirement).

39. (Currently Amended). A process for obtaining a cross-incompatible inbred maize plant comprising a ~~*Tcb*~~ gene cluster that encodes for a

TCB trait, which when crossed with a second inbred maize plant, produces a hybrid maize plant which is cross-incompatible and contains a ~~Tcb~~ gene cluster that encodes for a TCB trait within its genome, the process comprising the steps of:

a) selecting a first donor parental maize plant from a population of maize plants, wherein said first donor parental maize plant is cross-incompatible and contains a ~~Tcb~~-gene cluster that encodes for a TCB trait;

b) crossing said selected first donor parental maize plant with a second parental maize plant containing genes which encode for desirable traits in hybrid combination;

c) collecting the seed resulting from the cross in step b);

d) planting and growing the seed collected in step c) under plant growth conditions;

e) screening the resulting plant population for the presence of the ~~Tcb~~ gene cluster that encodes for a TCB trait identified in step (a); and

f) selecting plants from said population having the ~~Tcb~~ gene cluster for cross-incompatibility for further crossings and screenings until a line is obtained which is homozygous for the ~~Tcb~~ gene cluster for cross-incompatibility to provide such a gene cluster in an inbred to be used in hybrid combination.

40. (Previously Presented). The process of claim 39 wherein said gene cluster is located on the short arm of chromosome 4 between map units 40-85.

41. (Previously Presented). The process of claim 39 wherein the first

donor parental maize plant further comprises a *Tcb* locus.

42. (Original). The process of claim 41 wherein said *Tcb* locus is located on the short arm of chromosome 4 about 6 map units distal to the *sugary1* gene and about 40 map units from the *Ga1* gene.

43. (Original). The process of claim 41 wherein said *Tcb* locus comprises at least one gene which encodes for a silk effect function in said plant.

44. (Previously Presented). The process of claim 41 wherein said *Tcb* locus comprises at least one gene which encodes for a pollen effect function in said plant.

45. (Original). The process of claims 40, 41, 43 or 44 wherein the first donor parental maize plant further comprises at least one modifier gene.

46. (Currently Amended). The process of claim 39 wherein the second parental maize plant is cross-incompatible and comprises a ~~*Teb*~~ gene cluster that encodes a TCB trait.

47. (Currently Amended). A cross-incompatible inbred maize plant comprising a ~~*Teb*~~ gene cluster that encodes a TCB trait produced by the process of claim 39.

48. (Currently Amended). A process for producing a cross-incompatible hybrid maize plant exhibiting a TCB trait, the process comprising the steps of:

a) crossing the inbred maize plant of claim ~~39~~ 47 with a second maize inbred line comprising genes encoding desirable phenotypic traits to produce a segregating plant population; and

b) collecting the hybrid seed resulting from the cross in step a.

49. (Currently Amended). The process of claim 48 wherein the second maize inbred line is cross-incompatible and comprises a ~~Tcb~~ gene cluster that encodes a TCB trait within its genome.

50. (Original). A cross-incompatible hybrid maize plant comprising a TCB trait produced by the process of claim 48.

51-58. (Canceled in Response to a Restriction Requirement).

59. (Previously Presented). A process for selecting a cross-incompatible hybrid maize plant exhibiting a TCB trait, the process comprising the steps of:

analyzing each plant from a population of hybrid maize plants for those plants exhibiting a TCB trait.

60. (Original). The process of claim 59 further comprising the step of analyzing the DNA of each plant from said population for a gene cluster wherein said gene cluster is located on the short arm of chromosome 4 between map units 40-85.

61. (Original). The process of claim 60 further comprising the step of analyzing the DNA of each plant from said population for a *Tcb* locus.

62. (Original). The process of claim 61 wherein said *Tcb* locus is located on the short arm of chromosome 4 about 6 map units distal to the *sugary1* gene and about 40 maps units from the gene *Ga1* gene.

63. (Original). The process of claim 61 further comprising the step of analyzing the DNA of each plant from said population for at least one gene which encodes for a silk effect function in said plant.

64. (Previously Presented). The process of claim 61 further comprising the step of analyzing the DNA of each plant from said population for at least one gene which encodes for a pollen effect function in said plant.

65. (Original). The process of claims 60, 61, 63 or 64 further comprising the step of analyzing the DNA of each plant of said population for at least one modifier gene.

66. (Original). A cross-incompatible hybrid maize plant comprising a TCB trait produced by the process of claim 60.

67. (Previously Presented). A process of controlling hybridization of a maize plant in a field, the process comprising the step of planting in a field a cross-incompatible maize plant of claims 1, 4, 5, 15, 16, 17, 27, 34, 35, 47, 50, or 66.

68. (Previously Presented). A process of controlling hybridization of inbred maize plants being used in hybrid seed production, the process comprising the step of planting in a field at least one cross-incompatible inbred maize plant of claims 4, 16, 34, or 47 with at least one second inbred maize plant and crossing the cross-incompatible inbred maize plant with the second maize inbred maize plant to produce a hybrid maize seed.

69-72. (Canceled).

73. (Currently Amended). A process for obtaining a cross-incompatible inbred maize plant comprising a ~~Tcb~~ gene cluster that encodes for a



TCB trait, which when crossed with a second inbred maize plant, produces a hybrid maize plant which is cross-incompatible and contains a ~~Tcb~~ gene cluster that encodes for a TCB trait, the process comprising the steps of:

- a) crossing a first donor parental maize plant comprising a ~~Tcb~~ gene cluster that encodes for a TCB trait with a second donor parental maize plant containing genes that encode for desirable traits in hybrid combination, wherein the ~~Tcb~~ gene cluster in said first donor parental maize plant comprises a *Tcb* locus and at least one modifier gene;
- b) collecting the seed resulting from the cross in step a);
- c) planting and growing the seed collected in step b) under plant growth conditions;
- d) obtaining DNA from each of the plant of the plant population grown in step c);
- e) analyzing the DNA obtained from each plant in step d) using at least one molecular marker including and between molecular markers umc1117 and bnlg490 shown in ~~Figure 4~~ Figure 3B to identify a *Tcb* locus and at least one modifier gene;
- f) selecting plants from said population having the *Tcb* locus and at least one modifier gene for further crossings and screenings;
- g) repeating steps d) – f) until a line is obtained which is homozygous for the *Tcb* gene cluster for cross-incompatability to provide, such a trait in an inbred maize plant to be used in hybrid combination; and
- h) selecting plants from said population having the ~~Tcb~~ gene

cluster for cross-incompatibility for further crossings and screenings until a line is obtained which is homozygous for the ~~Tcb~~ gene cluster for cross-incompatibility to provide such a trait in an inbred maize plant to be used in hybrid combination.

74. (Currently Amended). A cross-incompatible inbred maize plant comprising a ~~Tcb~~ gene cluster that encodes for a TCB trait produced by the process of claim 73.

75. (Previously Presented). A process for producing a hybrid maize plant which is cross-incompatible and exhibits a TCB trait, the process comprising the steps of:

a) crossing the inbred maize plant of claim 74 with a second maize inbred line comprising genes encoding desirable phenotypic traits to produce a segregating plant population; and

b) collecting the hybrid seed resulting from the cross in step a).

76. (Currently Amended). The process of claim 75 wherein the second maize inbred line is cross-incompatible and comprises a ~~Tcb~~ gene cluster within its genome that encodes for a TCB trait, wherein the ~~Tcb~~ gene cluster comprises a *Tcb* locus and at least one modifier gene.

77. (Previously Presented). A cross-incompatible hybrid maize plant comprising a teosinte crossing barrier trait produced by the process of claim 75.

78. (Currently Amended). A process for selecting a cross-incompatible hybrid maize plant that exhibits a TCB trait, the process comprising the steps of:

a) obtaining a population of hybrid maize plants;

b) obtaining DNA from each plant from the population of hybrid maize plants of step a);

c) analyzing the DNA obtained from each plant in step b) using at least one molecular marker including and between molecular markers *umc1117* and *bnlg490* shown in ~~Figure 1~~ Figure 3B to identify a *Tcb* locus and at least one modifier gene; and

d) selecting a hybrid maize plant from said population having the teosinte crossing barrier trait.

79. (Previously Presented). A cross-incompatible hybrid maize plant comprising a TCB trait selected by the process of claim 78.

80. (Previously Presented). A process of controlling hybridization of inbred maize plants in a field being used in hybrid seed production, the process comprising the step of planting in a field being used for hybrid seed production, a cross-incompatible inbred maize plant of claim 74 and crossing the cross-incompatible inbred maize plant with another inbred maize plant to produce a hybrid maize plant.

Please add new claims 81-86:

81. (New). A process for obtaining a cross-incompatible inbred maize plant comprising a gene cluster that encodes for a TCB trait, which when crossed with a second inbred maize plant, produces a hybrid maize plant which is cross-incompatible and contains a gene cluster that encodes for a TCB trait, the process comprising the steps of:

a) crossing a first donor parental maize plant comprising a

gene cluster that encodes for a TCB trait with a second donor parental maize plant containing genes that encode for desirable traits in hybrid combination, wherein the gene cluster in said first donor parental maize plant comprises a *Tcb* locus and at least one modifier gene and further wherein said first donor parental maize plant is derived from a maize plant designated W22-TCB, seeds of which have been deposited as ATCC No. PTA-1601;

- b) collecting the seed resulting from the cross in step a);
- c) planting and growing the seed collected in step b) under plant growth conditions;
- d) obtaining DNA from each of the plant of the plant population grown in step c);
- e) analyzing the DNA obtained from each plant in step d) using at least one molecular marker including and between molecular markers *umc1117* and *bnlg490* shown in Figure 3B to identify a *Tcb* locus and at least one modifier gene;
- f) selecting plants from said population having the *Tcb* locus and at least one modifier gene for further crossings and screenings;
- g) repeating steps d) – f) until a line is obtained which is homozygous for the gene cluster for cross-incompatability to provide such a trait in an inbred maize plant to be used in hybrid combination; and
- h) selecting plants from said population having the gene cluster for cross-incompatibility for further crossings and screenings until a line is obtained which is homozygous for the gene cluster for cross-incompatibility to provide such a trait in an inbred maize plant to be used in hybrid combination.

82. (New). A cross-incompatible inbred maize plant comprising a gene cluster that encodes for a TCB trait produced by the process of claim 81.

83. (New). A process for producing a hybrid maize plant which is cross-incompatible and exhibits a TCB trait, the process comprising the steps of:

a) crossing the inbred maize plant of claim 82 with a second maize inbred line comprising genes encoding desirable phenotypic traits to produce a segregating plant population; and

b) collecting the hybrid seed resulting from the cross in step a).

84. (New). The process of claim 83 wherein the second maize inbred line is cross-incompatible and comprises a gene cluster within its genome that encodes for a TCB trait, wherein the gene cluster comprises a *Tcb* locus and at least one modifier gene.

85. (New). A cross-incompatible hybrid maize plant comprising a teosinte crossing barrier trait produced by the process of claim 83.

86. (New). A process of controlling hybridization of inbred maize plants in a field being used in hybrid seed production, the process comprising the step of planting in a field being used for hybrid seed production, a cross-incompatible inbred maize plant of claim 82 and crossing the cross-incompatible inbred maize plant with another inbred maize plant to produce a hybrid maize plant.